

CLAIMS:

1. A composition suitable for mucosal delivery comprising an HIV envelope antigen and a detoxified mutant A subunit of *E. coli* heat labile toxin (LT) selected from one or more of the group consisting of LTK63 and LTR72.
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2. The composition of claim 1, wherein said heat labile toxin is LTK63.
3. The composition of claim 1, wherein said heat labile toxin is LTR72.
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4. The composition of claim 1, wherein said toxin comprises a holotoxin of said *E. coli* heat labile toxin.
5. The composition of claim 1, wherein said envelope protein is selected from the group consisting of gp120, gp160 and ogp140.
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6. The composition of claim 1, wherein said HIV envelope antigen is optimized for immunogenicity.
7. The composition of claim 1, wherein said composition further comprises a second HIV antigen.
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8. The composition of claim 7, wherein said second HIV antigen is optimized for immunogenicity.
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9. The composition of claim 7, wherein said second HIV antigen is selected from one or more of the group consisting of HIV structural proteins, HIV regulatory proteins, and HIV accessory proteins.
10. The composition of claim 9, wherein said HIV structural protein is selected from the group consisting of Gag, Pol and envelope.
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11. The composition of claim 9, wherein said HIV regulatory protein is selected from the group consisting of Tat and Rev.

12. The composition of claim 9, wherein said HIV accessory protein is selected from the group consisting of Vpu, Vpr, Vif, and Nef.

5 13. The composition of claim 10, wherein said second HIV antigen is gag.

14. The composition of claim 1, wherein said composition is suitable for intranasal delivery.

10 15. The composition of claim 1, wherein said composition is suitable for intra-vaginal delivery.

16. The composition of claim 1, wherein said composition is suitable for intra-rectal delivery.

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17. A composition suitable for mucosal delivery comprising a polynucleotide encoding for an HIV envelope protein and a detoxified mutant A subunit of *E. coli* heat labile toxin (LT) selected from one or more of the group consisting of LTK63 and LTR72.

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18. A composition suitable for mucosal delivery comprising an HIV envelope protein and a polynucleotide encoding a detoxified mutant A subunit of *E. coli* heat labile toxin (LT) selected from one or more of the group consisting of LTK63 and LTR72.

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19. A method for raising an immune response in a subject comprising mucosally administering a composition comprising an HIV envelope antigen and a detoxified mutant A subunit of *E. coli* heat labile toxin (LT) selected from the group consisting of LTK63 and LTR72.

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20. The method of claim 19, wherein said heat labile toxin is LTK63.

21. The method of claim 19, wherein said heat labile toxin is LTR72.

22. The method of claim 19, wherein said toxin comprises a holotoxin of said *E. coli* heat labile toxin.
- 5 23. The method of claim 19, wherein said envelope protein is selected from the group consisting of gp120, gp160 and ogp140.
24. The method of claim 19, further comprising administering a second HIV antigen.
- 10 25. The method of claim 24, wherein said second HIV antigen is selected from one or more of the group consisting of HIV structural proteins, HIV regulatory proteins, and HIV accessory proteins.
- 15 26. The method of claim 24, wherein said second HIV antigen is gag.
27. The method of claim 17 wherein said composition is administered intranasally.
- 20 26. The method of claim 19, wherein said composition is administered intravaginally.
27. The method of claim 19, wherein said composition is administered intrarectally.
- 25 28. A method for raising an immune response in a subject comprising mucosally administering a composition comprising a polynucleotide encoding an HIV envelope antigen and a detoxified mutant A subunit of *E. coli* heat labile toxin (LT) selected from the group consisting of LTK63 and LTR72.
- 30 29. A method for raising an immune response in a subject comprising mucosally administering a composition comprising an HIV envelope antigen and a polynucleotide encoding a detoxified mutant A subunit of *E. coli* heat labile toxin (LT) selected from the group consisting of LTK63 and LTR72.